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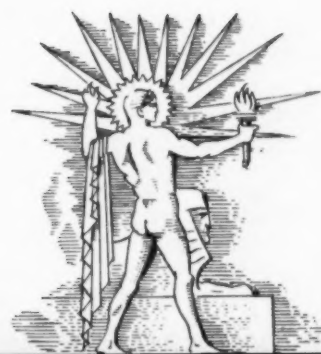
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MAY 6 - 1939

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



May 6, 1939

Honored

See Page 276

A SCIENCE SERVICE PUBLICATION

## Do You Know?

Greek archaeologists plan to excavate at the site of Plato's academy in Athens.

Fisheries of the bleak North Atlantic coast were an attraction important in the colonization of North America.

Delaware is the only State in which no big game animals were reported when the U. S. Biological Survey took recent inventory.

Despite popular belief, an ostrich does not stick its head in the ground; it lies down and stretches out its neck—keeping its eyes open.

To lessen the guesswork in maple syrup making, New York scientists have devised a simple thermometer for measuring sap density.

An invention for highway safety is a large prismatic lens set overhead at the crest of a hill, to show motorists what is coming up the other side.

For the sake of preserving the wild flowers, conservationists urge nurserymen and plant dealers to grow as much stock as possible from seed.

If science could evolve a chemical or gas distasteful to sharks, it might help shipping, airlines, fishermen, and pearl divers, says Dr. Harden F. Taylor.

An observer has reported watching a mother eagle teaching a young bird to fly by repeatedly dropping it and then swooping down to catch it on her back.

## QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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### PSYCHOLOGY

What sometimes hinders one ape from learning from another? p. 286.

### PSYCHOLOGY—SOCIOLOGY

Which are the best cities distinguished for, dentists or clergymen? p. 284.

A new camera judges bread and cake by taking a picture of the inside cell and crumb structure.

When Jacques Cartier's crew landed in Labrador in 1535 they were suffering from scurvy, which Indians treated with a decoction of spruce needles—a good source of vitamin C, though no one knew about vitamins then.

In a health study made at Cornell University, only six per cent. of almost 3,000 people interviewed appeared to be "living without worries and without waiting for something."

About 5,000 of the goats running wild in Hawaii's National Park were removed last year to conserve park vegetation.

A bottle of "nothing" prepared with the best vacuum facilities available still contains quadrillions of molecules of assorted rare gases.

An American expedition recently found in the New Guinea jungle a tribe with such advanced farming practices as crop rotation, use of trees as windbreaks and to prevent soil erosion, and a system of land irrigation and drainage.

## SCIENCE NEWS LETTER

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## MEDICINE

# Nitrogen Is Breathed In New Treatment for Mentally Ill

**Gas Administration Is Easier Than Insulin Shock And Does Not Produce the Convulsions of Metrazol**

**M**ENTALLY sick patients are now being rescued from the world of the insane by the simple and comparatively safe measure of breathing nitrogen. "Encouraging results" of this new, non-shock treatment for insanity in a small series of cases were reported by Drs. H. E. Himwich, F. A. D. Alexander, Basile Lipetz and J. F. Fazekas, of Albany, N. Y., Medical College and Union University to the Federation of American Societies for Experimental Biology, meeting in Toronto.

The new treatment achieves its effect by the same mechanism as the drastic insulin and metrazol shock treatments. This is by decreasing the metabolic activity of the brain. The nitrogen inhalation treatment, however, is easier to give than insulin shock and does not produce the fearful convulsions of metrazol treatments which are dreaded by both patients and physicians.

With the new treatment, patients breathe nitrogen long enough to deprive the brain of its oxygen supply for about five minutes. These treatments are given three times a week for a period of about three months.

Cutting down the oxygen supply to the brain reduces its metabolic activity. Metrazol does the same thing by temporarily arresting breathing movements. Insulin shock does it by depleting the sugar supply to the brain, without which the brain cannot use oxygen.

The fact that metrazol and insulin shock treatments both produced this effect of decreased metabolic activity was discovered a year ago by a University of Toronto research team under the leadership of Sir Frederick Banting and Dr. G. Edward Hall. At that time Dr. Hall predicted that neither insulin nor metrazol would be the last word in treatment of schizophrenia and that a bet-

ter and less severe remedy would be found to replace them. The nitrogen inhalation treatment seems now to be that remedy.

## Insulin Sobers Alcoholics

**D**RUNKS, not ordinary ones but those who were completely "out" in serious alcoholic coma, were sobered up in two hours or less and able to walk alone within four hours by injection of sugar and the diabetes remedy, insulin, Drs. Walter Goldfarb, Karl M. Bowman and Samuel Parker of Bellevue and King's County Hospitals, New York, reported.

This sobering-up treatment works for any intoxicated person, Dr. Goldfarb said, but the results are most startling in cases of acute alcoholism. Although he and his associates have tried it on persons not acutely intoxicated, it is only being used for serious cases where there is danger of the patient dying or being very ill for a long time. The ordinary drunk, Dr. Goldfarb pointed out, will recover without any treatment. But this insulin-sugar treatment can be given by any physician in his office or the patient's home; it is not dangerous, and there is no reason, Dr. Goldfarb said, why it should not be given to any intoxicated person.

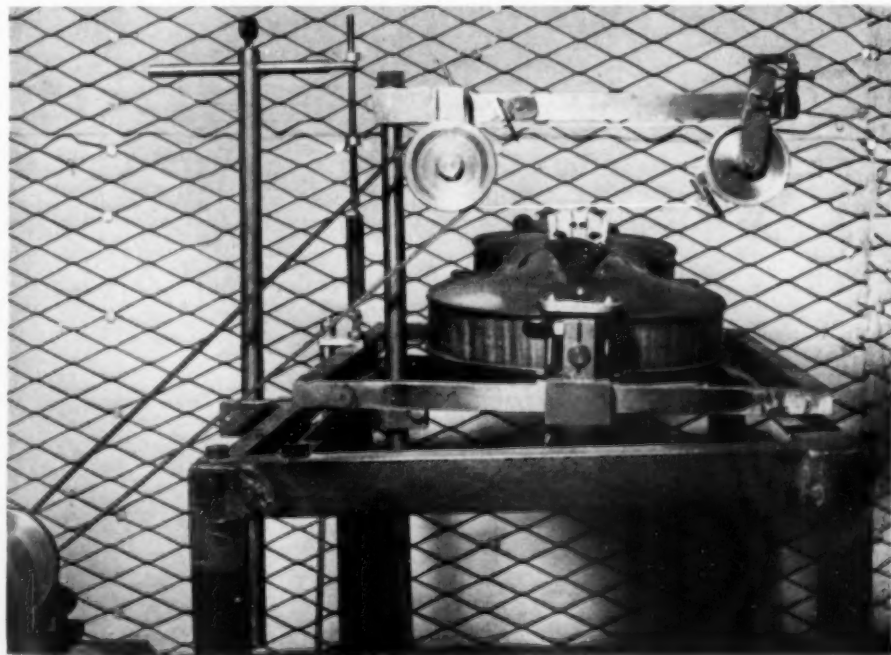
Insulin alone had no effect, the New York investigators reported, and sugar alone only helped in cases of severe intoxication where the amount of alcohol in the blood was over 300 milligrams per cent. Burning of alcohol and its consequent disappearance from the body, it was suggested, may be speeded by catalytic action of simultaneous oxidation or burning of sugar.

## Reduce To Avoid Diabetes

**A**VOID eating many fat foods to avoid getting diabetes may be the advice doctors will give in the future as a result of research reported by Drs. Reginald E. Haist and Jessie Ridout and Prof. C. H. Best of the University of Toronto.

Doctors are already advising people to avoid overweight as a precaution against diabetes because overweight persons are known to be more likely to develop the ailment. The reducing diet for prevention of diabetes, if advised on the basis of the research reported, would cut down fat foods more than sweet and starchy foods.

Diets very rich in fats markedly reduced the insulin content of the pan-



**MUSIC WITHOUT MUSICIAN**

*This mechanically played violin was described before the National Academy of Sciences by Dr. C. E. Seashore, of the University of Iowa. The mute, he found, although made of many materials, depends for its effect upon weight alone.*



creas in experimental animals, the Toronto investigators found. Lack of insulin, due to failure of the islands of Langerhans in the pancreas, causes diabetes. Diets very rich in carbohydrates, that is, in starchy and sweet foods, did not decrease the insulin content of the pancreas.

## Test Aids Birth Control

**B**IRTH control by the calendar method may be put on a sounder and more practical basis as a result of a discovery announced by Dr. Richard Parmenter of Cornell University Medical College, Ithaca, N. Y.

A simple electrical test of a woman's fingertips, it appears from his report, may be all that is necessary to determine the so-called safe period on which the calendar method of birth control is based. Difficulty in determining the infertile and therefore "safe" period accurately has been an important obstacle to the rhythm or calendar method of birth control.

In seven out of eight normal healthy women Dr. Parmenter tested by recording the voltage of the minute electrical current at the tips of their index fingers, a marked rise in potential difference was observed to occur at some moment during the period generally considered "unsafe" because sometime during this period ovulation occurs.

If this change in potential difference marks the time of ovulation, it provides an accurate basis for calculating the "safe period." If such a test proves reliable it will also have the advantage of simplicity over other proposed tests.

## Study Maturing Human Eggs

**T**HE MATURING process of human eggs outside the body, both in glass vessels and when planted in female rabbits, is now being studied by Dr. Gregory Pincus, of Clark University, the scientist who has already caused considerable excitement by starting the development of so-called "fatherless" rabbit eggs.

These rabbit eggs were induced to start the normal processes of division and differentiation, without the intervention of the male elements or sperm cells, by treatment with salt solution and also by heat treatment.

The experiments with human eggs which Dr. Pincus reported are "distinctly not attempts to obtain human offspring," he emphasized. They are, in Dr. Pincus' words, "simply studies of

the maturation of human ovarian ova."

The human eggs for these experiments were obtained from ovaries removed by surgical operation. They were nourished on human blood serum. One group was given no other treatment. Within eight and one-half hours half of these eggs were "activated," that is, started on the first stage of the process toward "maturing." Eggs in other groups were stimulated by treatment with sperm extract for from 15 to 20

minutes. A slightly smaller percentage reached the same stage of activation. Others were stimulated by heat or salt solutions. About two-fifths of these were also activated. Foster-mothering to the extent of transplanting the treated eggs to rabbit fallopian tubes did not increase the percentage of those activated. Activation of the eggs is a sort of growing-up process in which the eggs get ready for fertilization.

*Science News Letter, May 6, 1939*

### GENERAL SCIENCE

# Dr. Frank B. Jewett Elected President of National Academy

Head of Bell Telephone Laboratories Has Directed Revolutionary Research in Telephony and Pure Physics

See Front Cover

**S**CIENTIFIC research supported by industry received high recognition at the annual meeting of the National Academy of Sciences, in the election of Dr. Frank B. Jewett, head of the Bell Telephone Laboratories, to the presidency of this body of America's senior scientists.

From the laboratories under Dr. Jewett's direction have come not only many revolutionary inventions and improvements in telephony, sound equipment, and wire transmission but also researches of great consequence in the field of "pure" physics.

Two vacancies on the governing council of the Academy were filled by the election of Prof. Charles A. Kraus of Brown University and Prof. Alfred N. Richards, University of Pennsylvania.

Election as Foreign Associates, the highest honor which the Academy can bestow upon overseas scientists, was accorded to two Britons and one Netherlander: Sir Joseph Barcroft, noted physiologist of Cambridge University; Sir William Bragg, physicist of the Royal Institution, London, who delivered the principal address of the meeting just closed; and Dr. F. A. Vening Meinesz, geophysicist of the University of Utrecht, already well known in this country through his underseas researches in submarines, in which the U. S. Navy participated along with American scientific institutions.

Fifteen new members were elected to membership in the Academy: Dr. Greg-

ory Breit, University of Wisconsin, theoretical physics; Prof. Detlev Wulf Bronk, University of Pennsylvania, biophysics; Dr. William Bosworth Castle, Harvard University, medicine; Dr. Frederick Gardner Cottrell, Research Associates, Inc., chemistry; Prof. Frederick Parker Gav, Columbia University, pathology and bacteriology; Dr. Albert Baird Hastings, Harvard University, physiology and chemistry; Prof. Vladimir Nikolaeich Ipatieff, Universal Oil Products, chemistry; Prof. Merkel Henry Jacobs, University of Pennsylvania, zoology; Dr. Zay Jeffries, General Electric Company, metallurgy; Dr. Donald Forsha Jones, Connecticut Agricultural Experiment Station, genetics; Prof. George Bogdan Kistiakowsky, Harvard University, chemistry; Prof. Warren Judson Mead, Massachusetts Institute of Technology, geology; Dr. Oscar Riddle, department of genetics, Carnegie Institution of Washington, biology; Prof. Adolph Hans Schultz, Johns Hopkins University, embryology; Prof. Philip Edward Smith, College of Physicians and Surgeons, Columbia University, anatomy.

## Four Medals Presented

**A**T THE Academy's annual banquet four medals and awards for notable work in science were made, three to Americans and one to an English guest.

The Agassiz medal for oceanography was presented to Dr. Harald Ulrick Sverdrup, of the Scripps Institution of

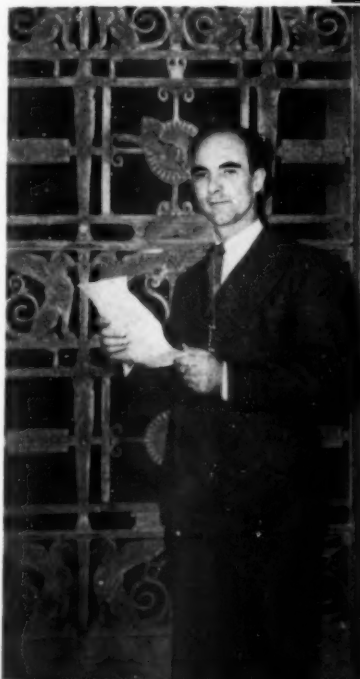
## ACADEMICIANS

In top picture, Dr. Frank R. Lillie, president of the National Academy of Sciences (left) greets Sir William Bragg, president of the Royal Society. Dr. Carl D. Anderson, Nobelist of the California Institute of Technology is shown at left center. Below, left, Dr. G. H. Parker, Harvard, discusses the program with Dr. Edwin C. Conklin, of the American Philosophical Society, president of Science Service.



## SPRING MEETING

Arriving (center) is Dr. Arthur H. Compton, Nobelist of the University of Chicago. Prof. H. S. Burr, Yale University (right center) listens to discussion. At right below, Prof. Harold C. Urey, Nobelist of Columbia University, and Mrs. Urey watch a demonstration of the "Electromagnetic Levitator" by Lyle H. B. Peer, of General Electric (center). All photographs are by Fremont Davis, Science Service staff photographer.



Oceanography, by Dr. T. Wayland Vaughan, formerly director of that institution.

The Daniel Giraud Elliot medal, with an accompanying honorarium of \$200, was awarded to Prof. Theophilus S. Painter of the University of Texas, in recognition of notable contributions to the science of genetics.

A second award of the Daniel Giraud Elliot medal, with honorarium, was made to Prof. Richard Swann Lull of the Peabody Museum of Natural History, Yale University. Prof. Lull is known for his work in paleontology; the award was a special recognition of a study entitled "A Revision of the *Ceratopsia* or Horned Dinosaurs."

The John J. Carty medal and award of \$3,000 were presented to Sir William Bragg of the Royal Institution, London, who delivered the principal address on the opening evening of the meetings. Sir William is distinguished for his pioneering work in the use of X-rays for the study of crystal structure.

## Cancer Diagnosis in Mice

**I**F CANCER diagnosis by changes in the body's electrical field, reported by Prof. H. S. Burr of Yale University as giving promising results on mice, proves to be applicable to human beings, a great step forward in science's fight with cancer may be taken.

Significant changes in the body's electric field occur with growth of the body cells and appear to occur at the start of the extraordinary growth of cells which produce cancer. If this is true in mice, it may also be true in men, although Prof. Burr in his paper before the Academy was careful to limit his report to experiments upon mice alone.

## Kills Cancerous Tumors

**H**OPES that cancer may some day be more effectively treated by injecting distilled water into the diseased tissue after X-raying was held out by Drs. G. Failla and K. Sugiura of Memorial Hospital, New York City, in a report presented before the Academy.

Pronounced favorable results have been obtained in experimental work on mice. Nothing has yet been undertaken on human cancers, however; and Dr. Failla laid special emphasis on the fact that Memorial Hospital is not undertaking this treatment of human cases until much more experimentation can be carried out on mice.

In effect, the injected water seems to kill the cancer cells by drowning, while it does not harm normal cells. The X-rays put the diseased cells in a state of "ionic unbalance" with their surrounding fluids, the effect of which is to induce a rapid intake of water by the cells. If distilled water is injected into the tissues while they are in this state, the cells take in too much of it and are killed.

Results on mice were very decisive. Mice with a certain type of sarcoma, treated with 500 X-ray units alone, showed only a 2 per cent. regression in their tumors. Similar mice given the same X-ray dosage plus distilled water injections showed a 30 per cent. regression. At 1000 X-ray units, mice showed only 50 per cent. regression in tumors treated by raying only, while tumors treated by the same raying plus water disappeared entirely.

"As to practical application of these findings nothing can be said at this time," Dr. Failla stated in conclusion. "If human tumors react in the same way to the combined X-ray and distilled water treatment as mouse sarcoma 180, the range of successful application of X-rays in the treatment of cancer will be ma-

terially increased. For, at present, good results cannot be obtained in many cases because the tumor is so insensitive to X-rays that the large dose required to kill it will cause too much damage in adjoining normal tissues."

## Like Pan of Biscuits

**T**HE granite crust of the earth that underlies the continents is not a single solid slab all formed at the same time. It is more like a pan of biscuits, with centers of solidification in a number of separate blocks, Dr. Bailey Willis, emeritus professor of geology at Stanford University, told the meeting.

Dr. Willis described in particular the formation of the largest of the continents, Asia. Asia, he said, is not the vast single sheet of Archaean granite that earlier geologists believed it to be. Several massive blocks of the continent are of that date, from a billion to a billion and a half years ago.

In between them, however, are other intrusions of much younger granites, that come down to almost modern times. Asia is thus not a solid slab of rock but a considerably varied mosaic.

*Science News Letter, May 6, 1939*

## MEDICINE

# Pneumonia Prevention By Vaccination May Be Possible

**P**NEUMONIA prevention by vaccination of all susceptible persons may be possible within three years, if the plan proposed at the Conference of State and Territorial Health Officers with the U. S. Public Health Service goes through.

The plan was proposed by Dr. Lloyd D. Felton, U. S. Public Health Service, in a report of the pneumonia vaccine he has prepared and which has been getting its preliminary trials on CCC men.

This vaccine can reduce the number of pneumonia cases at least one-half, Dr. Felton found by comparison with a similar group of non-vaccinated persons. The death rate can be reduced to at least that obtained by treatment of pneumonia with serum.

The vaccine, moreover, can apparently pick out in a group of people those who are especially susceptible to the ailment. Most persons vaccinated showed no reaction to the vaccine itself, but a few, about one-tenth, did have a reaction after the first dose of vaccine.

Dr. Felton's plan is to make skin tests with the vaccine of a large group of persons and to watch these people over a period of three years. The persons tested would be divided into two groups, those who reacted to the skin test and those who did not. If more pneumonia cases developed during the three years among the ones the test showed to be susceptible than among the other group, it would indicate that the test really picked the susceptibles.

With this as a basis, it would not be necessary to vaccinate the entire population against pneumonia. The ones needing the vaccination could be picked by preliminary skin testing, just as children needing toxoid to protect them against diphtheria are now picked by preliminary Schick testing.

*Science News Letter, May 6, 1939*

Yosemite National Park has a big Sequoia tree that leans off-center farther than the famed Tower of Pisa.





## GENUINE RELIC

*Chemical tests show that this is genuine Drake Plate. Hole in corner fits Elizabethan sixpence.*

## MEDICINE

## Aviation Medicine Laboratory Opened at Mayo Clinic

**T**HE MAYO CLINIC, mecca for medical men and the ill, is adding to its tremendous research facilities an aviation medicine laboratory to study problems brought in the train of the air age.

A low-pressure tank simulating conditions at high altitudes, similar to the Army's tank at Wright Field, O., is now being installed in a new Laboratory for Metabolic Investigation and Aero-Medical Research. Both the Army and Navy are expected to cooperate with the Clinic's new research unit.

The laboratory will be in the charge of Dr. Walter M. Boothby, who with Drs. A. L. Bulbulian and W. Randolph Lovelace, II, invented the Clinic's most recent contribution to flying—the B.L.B. inhalator, an oxygen mask for use at high altitudes where the air is too thin to keep human beings functioning properly.

Effects of high altitude on the human body, and of rapid climbing and descent—both encountered in military flying, for example—are to be investigated by Dr. Boothby and his associates.

The effect of low atmospheric pressure on the human body, when oxygen is being taken through a mask, is also to be studied. At 18,000 feet, for example, the pressure is only seven and a half pounds per square inch instead of 15 pounds as at sea level. It is suspected that gases breathed in through the mask may diffuse more readily under the high altitude conditions.

Use of helium in a mixture with the oxygen to enable more rapid descent without producing earaches is also to be studied. Already tried with considerable success, helium's relieving effect is believed due to the fact that the light gas diffuses through the Eustachian tubes to the inside of the ears much more rapidly than air, with the result that pressure inside and outside the ear is equalized. It is this difference in pressure which pains the eardrums.

Dr. Lovelace is now en route to Europe on a two or three month trip financed by an I. William White traveling fellowship. He will study European aero-medical research activities.

*Science News Letter, May 6, 1939*

## CHEMISTRY

## Tests Prove Brass Plate Genuine Relic of Drake

**S**IR Francis Drake's famous plate of brass, on which he claimed the California coast as a kingdom for England, has definitely been found, according to the result of six chemical tests given to the piece of now-battered metal.

The tests close a heated controversy as to whether or not a brass plate picked up on the California shore, several years ago, is an historic American document or a hoax. Prof. Colin G. Fink and E. P. Polushkin of Columbia University Electrochemical Laboratories put the engraved metal object through a series of tests at request of the California Historical Society.

They declare in a published report, "it is our opinion that the brass plate examined by us is the genuine Drake Plate referred to in the book, 'The World Encompassed' by Sir Francis Drake, published in 1628."

Chemical tests show dark coating on the surface to be natural patina, formed slowly through many years. Bits of mineralized plant tissue were detected, another sign of age. Composition of the brass and the hammering it underwent fit the Drake era. A ragged hole was tested to see whether it might have taken insertion of an Elizabethan sixpence, such as Drake used to introduce Queen Elizabeth's image and device on the brass record. It very well might. Drake in claiming the land for his queen called it New Albion.

*Science News Letter, May 6, 1939*

## AERONAUTICS

## Canada Is to Build Air Research Station

**T**HE DOMINION Government, acting through the Committee of the Privy Council on Scientific and Industrial Research, has acquired the site for an aeronautical research laboratory the government will build adjoining the Ottawa-Rockcliffe airfield, W. D. Euler, chairman of the committee, announced.

A hundred acres for expansion of the National Research Council's present laboratories and for conducting outdoor tests, for which no facilities at present exist, have been acquired. The total cost of the new research plant will come to \$1,459,895 and will extend over a two-year period. Present work is being carried out in the Research Council's laboratory annex in Ottawa.

*Science News Letter, May 6, 1939*

## ASTRONOMY

**Kopff's Comet Re-Found After Seven Year Absence**

**T**O join brilliant Hassel's comet still in the northwest sky, Kopff's periodic comet has returned to the vicinity of the earth and sun after an absence of seven years. It was rediscovered by Prof. G. Van Biesbroeck of Yerkes Observatory early Saturday morning, April 22. Far too faint (thirteenth magnitude) to be seen by the unaided eye, it will be observed by large telescopes only. It is located in the constellation of Aquarius, the water-carrier, in the southeastern heavens just before sunrise.

Kopff's comet was first discovered in 1906, by a German whose name it bears.

*Science News Letter, May 6, 1939*

## PHYSICS

**Atmosphere Is World's Cheapest Raw Material**

**W**HAT is the cheapest and most important raw material on earth? Coal? Wrong. Wood? Wrong Again. Water? That's cheap enough, but there is something more useful and less expensive.

Air, the stuff we breathe. That is the world's cheapest raw material. It is all around us, wafted from city to country, from nation to nation, without freight costs and import duties. Essential to life, both animal and vegetable, it is also needed wherever fire burns.

Yet a mere 200 years ago it was believed that things that burned gave up a substance, phlogiston, whereas almost every kindergartener knows now that oxygen from air is added in combustion. Not until the closing decade of last century was the last 1% of the air's composition explored, but today, the rare gases, neon and argon, are used in large quantity to fill electric lamps.

Nitrogen, 81% of the air's volume, is one of the most essential elements. No longer are agriculture and war dependent upon Chile nitrate deposits for nitrogen because Haber process plants, producing some 4,000,000 tons of fixed nitrogen a year, supply our needs. Large as this amount is, it is only the nitrogen above a fifth of a square mile of earth's surface.

Oxygen, too, is extravagantly abundant. There is an enormous consumption of oxygen by the breathing of human beings, animals, etc. and the daily burning of wood, coal and petroleum. Fortunately vegetation can convert the

resulting carbon dioxide back into oxygen and thus restore the atmospheric balance. For every breathing human being, exhaling at the rate of 3 pounds of carbon dioxide per man per day, about three 200 foot trees are needed to break down the exhalations and return oxygen to the atmosphere.

In this lies a future danger. Dr. Russell Grimwade of Melbourne, Australia, reminds us that replacement of trees by buildings or even grain fields carries with it the danger of upsetting Nature's balanced air. He suggests that we may need to establish vegetation control to protect our atmosphere.

*Science News Letter, May 6, 1939*

## MEDICINE

**Sound Waves Are Tried As Cancer Treatment**

**A** NEW approach to the problem of treating cancer by the use of ultrasonic sound waves was reported to the American Chemical Society.

The procedure was revealed "as a preliminary investigation of the last few months" by Dr. John C. Krantz, Jr., and Frances F. Beck of the University of Maryland.

Ultrasonic sound waves vibrating 300,000 times a second have been used to study changes in the metabolism of cancer cells in rats. The scientists hope to find some differential effect of the sound waves on cancer tissue and normal tissue. As their goal, the scientists are seeking to destroy cancer cells without harming normal surrounding tissue.

The tests conducted by Dr. Krantz were carried out with rats which had been inoculated with abdominal cancer. The tumorous growth from the rats was suspended in an oil bath which contained two vibrating quartz plates. The intense oscillations of the supersonic waves make the cancer cells vibrate.

The test of the effect of the sound waves on the cancer cells was to determine how the tumor could use glucose (sugar) which was injected into the tumor. So new is the research that no positive beneficial effect has so far been noted, Dr. Krantz said. However, the studies are being continued because of their fundamental and important objectives.

In its way, the new method offers the possibility of using a new physical method of treating cancer which may, if it proves successful, some day rank with X-rays and gamma rays in cancer therapy.

*Science News Letter, May 6, 1939*

**IN SCIENCE**

## ASTRONOMY

**89-Year Sunspot Cycle Reported by Smithsonian**

**A** NEW rhythm in sunspot activity, recurring at intervals of 89.36 years, has been discovered by H. Helm Clayton, meteorologist of Canton, Mass., and is reported through the Smithsonian Institution. Mr. Clayton worked out the new cycle, which is divided into eight "seasons," by mathematical analysis of sunspot records since 1793, when reliable records first begun to be taken.

In the place of the old approximate cycle of 11 years, Mr. Clayton found a period consisting of exactly 11.17 years, and other periods of 5.56, 8.12, 8.94, 9.93, 11.14, 14.89 and 19.86 years respectively. All these are nearly submultiples of the fundamental period of 89.36 years, which now becomes the major sunspot period, and the one upon which predictions must be based.

Mr. Clayton checked his theoretical period by going back and "predicting" sunspots from 1880. The observed number and the calculated number came very close to identity.

According to the new method of prediction, sunspots will reach their next minimum in 1945 and the next maximum in 1949.

*Science News Letter, May 6, 1939*

## MEDICINE

**Rabies Vaccine May Come From Eggs in Future**

**V**ACCINE for the treatment of rabies may in future be prepared from eggs instead of rabbits. This is suggested by results of culture experiments reported by Dr. James R. Dawson, Jr., of Vanderbilt University School of Medicine. (*Science*).

Dr. Dawson has succeeded in transmitting the virus of rabies to chicks and also in implanting it in incubating eggs. The embryos developed, and apparently would have hatched if they had not been sacrificed for laboratory purposes. Examination of the central nervous systems of both chicks and unhatched embryos yielded positive evidence of the presence of the disease.

*Science News Letter, May 6, 1939*



# CE FIELDS

## ARCHAEOLOGY

## Monument of Rome's Victory Over Germans Found

THE long-lost Triumphal Arch of Tiberius, which the Roman Senate set up in 16 A. D. to hail victories over German tribes, has been found in Vatican City, archaeologists believe.

The discovery, made near the ancient Chancellery Building on Vatican territory, consists of five sculptured panels and includes the only known likeness of Emperor Tiberius as an old man. Pope Pius XII has instructed Prof. Nicola Maggi, assistant to the director of the Vatican Museums, to proceed with excavations, as the marble friezes are of outstanding importance for Roman archaeology.

The first carvings found lay 16 feet underground. They came to light during excavation of the tomb of Irtius, personal friend of Julius Caesar. The carvings show political figures of Tiberius' time, and processions of priests and magistrates.

The only clue to existence of the Tiberius arch has been in the writings of the historian Suetonius. He said the Senate decided to erect it to commemorate victories over the German tribes by Tiberius' son Drusus, and the recovery of the Roman insignia, or emblem, lost at the battle of the Teutoberg Forest. Even the location of the arch has been unknown.

*Science News Letter, May 6, 1939*

## MEDICINE

## Current Progress In Control of Arthritis

MANY reports are appearing these days on ways of treating and controlling arthritis or rheumatism as it used to be called. This is a reflection of increased activity on the part of medical scientists who are studying the problem. The number of different measures reported to have given good results may, however, be confusing.

There is no doubt that progress is being made. Doctors no longer take a hopeless attitude about the condition, and all authorities on the subject urge

arthritis sufferers to be optimistic. Cultivating a cheerful attitude, freeing the mind of worry and anxiety, are in fact now considered an important part of the treatment. This part, of course, is pretty much up to the patient.

Rest, both mental and physical, is very important. One authority, Dr. Walter Bauer, of Harvard Medical School, says that rest is probably as important in the treatment of rheumatoid arthritis as in the treatment of tuberculosis. Like tuberculosis patients, arthritis patients may need to be put to bed for complete rest, getting back to more normal life by slow stages.

So far as the various specific remedies or medicines reported to give good results are concerned, it must be remembered that arthritis patients are likely to have periods when they feel much better and others when they feel much worse. It is natural for them to credit the better periods to the last remedy tried and to think at last a "cure" has been found. The wise physician knows how to discount the effect of such periods of improvement and to wait for a much longer time before considering the remedy or treatment really effective.

If patients with arthritic or rheumatic tendencies are treated early, physicians say that the disease in many cases can be controlled. That is, it can be kept from going on to the stage of permanent joint damage, crippling and disability.

*Science News Letter, May 6, 1939*

## MEDICINE

## Cancer Discoveries Under Grants Can Be Patented

CANCER discoveries made with Uncle Sam's aid may be patented, the National Advisory Cancer Council has decided. When a scientist aided by federal cancer funds makes a discovery he will consult with the Surgeon General of the U. S. Public Health Service to determine whether it should be patented, and if so, how. Patenting is a vexing problem in medical circles.

Atom smashing neutron ray experiments at the University of California, directed at treatment and more control of cancer, were given \$23,000 more support. Surveys of cancer treatment and centers by the American College of Surgeons were implemented by \$7,500.

Three new centers for training physicians in cancer work were approved at Duke University, Durham, N.C.; Wayne University, Detroit, Mich.; and the New England Deaconess Hospital, Boston.

*Science News Letter, May 6, 1939*

## MEDICINE

## Scotch University Honors Discoverer of Prontosil

FOR HIS discovery of Prontosil, first of the now widely used group of chemical remedies that includes sulfanilamide and sulfapyridine, the German scientist, Dr. Gerhard Domagk, has been awarded the Cameron Prize for 1939 of Edinburgh University.

Dr. Domagk of the Institute for Experimental Pathology and Bacteriology of the I. G. Farbenindustrie—Germany's ranking chemical combine—found the chemical had amazing curative action on streptococcus infections in mice. This and many other infections in humans have since been successfully treated by Prontosil and its chemical relatives.

The Cameron prize is awarded to a person who, in the opinion of the Senate of the University, has made within the preceding five-year period a major contribution to practical therapeutics.

*Science News Letter, May 6, 1939*

## MEDICINE

## Copper, Electrically Injected Cures Fungus Diseases

COPPER, passed through the skin by electric current, is being successfully used in treating fungus infections of the hands and feet by physicians at Yale University Medical School.

In the past many remedies have been used to treat these painful and abhorrent skin infections without spectacular success.

Of 37 patients treated at Yale by means of electric current, 26 have been discharged as cured. Some of them had severe infections of long duration, one for as long as 25 years. The average number of treatments given was six.

The afflicted person sits with his feet immersed in enamel pans and with the hands in other basins. When the infection is on the feet, the hands are immersed in salt solution and the feet in 0.2 per cent. copper sulfate solution. For infections of the hands the relations are reversed.

The duration of the treatment is 20 minutes. Special apparatus has been devised to obviate the danger of electric shock.

Dr. Howard W. Haggard, Dr. Maurice J. Strauss and Leon A. Greenberg describe the new treatment in a preliminary report in the *Journal of the American Medical Association*. (April 1)

*Science News Letter, May 6, 1939*

GENERAL SCIENCE

# Faults of Science Application Lie in Lack of Morality

**Skill in the Use of What We Discover Is Not Acquired in a Day, But This Skill Can Be Learned**

**By SIR WILLIAM BRAGG**

**President, Royal Society of London**

*Sir William Bragg, Nobelist in physics, President of Britain's famous Royal Society and director of the Royal Institution, made this significant statement on "The Growth of Science", speaking as guest scientist on Science Service's Adventures in Science radio program over the nation wide network of the Columbia Broadcasting System.*

**T**HE WORD Science has come to mean a knowledge of nature, of the heavens and the stars, of the earth and all that it holds living and not living, and of all the forces that govern the constant changes that are to be observed in heaven and earth.

Science does not include the uses that we make of this knowledge, ships and steamengines and aeroplanes, X-rays and wireless and so forth. These are the applications of science which may be wise or unwise, charitable or selfish. The right use of science is a matter of morality and religion: science itself is knowledge only. The distinction is most important, because it is otherwise possible to blame science where the fault lies not in an excess of knowledge but in a lack of morality.

Science grows all the time. This is partly due to the natural curiosity of man, who loves to explore the unknown. It is a very great pleasure to unravel some mystery or to find some new thing in nature which has never been observed before. Another cause is the constant demand for more knowledge.

## Specific Needs

The doctor wants to know the inner nature of some disease, or to solve some question in connection with the health of the community.

The manufacturer wants the explanation of some unexpected defect, or better still to explore the possibilities of new constructions.

The engineer wants better materials wherewith to build, the agriculturist wants to grow stronger and fuller crops, to fight against pests and the conditions of weather and soil, and so on, and so

on. Thousands of new items of knowledge are added to the world's store every day. There is no stopping the continuous increase.

It is to be remembered that each item can probably be used for many purposes, quite different, it may be, from anything in the mind of the discoverer or from any purpose he had, if he had one at all. The poison gases of modern warfare were not invented as such: they have long been known and used, and if they could be and were abolished there would be a serious interruption in the world's work.

It is cheerful and indeed helpful to look at the bright side. We observe the increasing health of the community, the gradual lessening of pain and want and distress, the increase in the opportunities for wonder and admiration as the marvels of the world are unfolded. The more we understand and appreciate the power that knowledge gives us, and the good that we can do with it, the stronger and more ready we are to oppose its degradation by mistaken or evil usage.

Let me mention one or two important and interesting directions in which science is advancing at the present time.

## Study of Living Cell

I am inclined to head the list with the work that is proceeding in the region where biology and chemistry and physics meet, that is to say in the study of the living cell and tissues. Here strange discoveries are being made which will surely add to our understanding of the mechanical aspect of the living body, and enable us to improve our treatment of it.

Again, there are new methods by which it is possible to look down into the depths of the structure of metals and alloys, and to learn the origin of their very diverse properties. Of late years the science of metallurgy has been completely revised: and the novelty of its achievements is to be seen in the marvels of construction with which we are becoming familiar.

Of course, the wonders of electricity

never cease. In quite a different direction it is most interesting to observe the increase in the knowledge respecting the preservation of food: and naturally this is of first importance to the community. Is there anything more curious and interesting than the gas-storage of fruit? Or the preservation of food by choice of temperature? I need not give more illustrations.

Now comes the really important point. How are we to behave in the face of this growing knowledge of the world in its material aspects? I believe that most will trust to the observance of the fundamental rules of Christianity. I do not argue the question as to whether these rules are to be found in Christianity alone: that is outside my province today. Here is to be found the incitement to right action. After that comes wisdom, based on an understanding of the influence which natural knowledge has had and will have upon our lives. We have to acquire skill in the use of what we discover, and skill is not acquired in a day.

## Must Learn Quickly

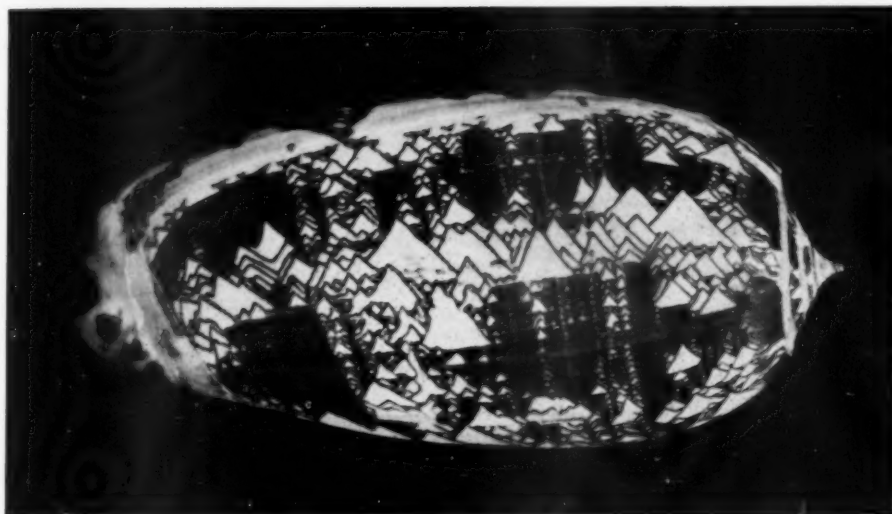
I believe that it is a mistake to lament that our troubles arise because morality is not growing fast enough to keep up with science. Morality cannot grow at such a rate. But if we give our minds to it we can acquire the skill which is wanted to make the right use of the growth of science: only, we have to learn quickly because science is growing so fast.

Science puts into our hands vast opportunities for improving the conditions that govern our lives. There is also good will in the world; far more I think than we might gather from what we read and hear; we should rather trust our everyday experiences with our neighbours. But wisdom and understanding are sorely lacking, and one of the greatest needs of the day is to learn how to make use of the knowledge we have gained.

It is to be remembered that speculation is not knowledge; speculation is necessary but must be kept strictly in its place. It is good when we use it to suggest the next step to be made: it is right also to remind ourselves that what we know is a drop in the ocean compared to what we do not know. There is a mysticism which is a confession of ignorance and is healthy: there is also a mysticism founded on uncontrolled imagination which may be dangerous.

*Science News Letter, May 6, 1939*

Mice age so rapidly that a two-year-old mouse is comparable to a man of 70.



NOT CHINESE MOUNTAIN LANDSCAPE

This design was painted by Nature on a tropical snail shell of the species *Oliva porphyria* which is now on exhibit in the Field Museum of Natural History.

## GENERAL SCIENCE

## British Nobelist Invents Substitute for "X-Ray" Eye

New Device of Director of Cavendish Laboratory Makes Visible Arrangement of Atom in a Crystal

**A**N INGENIOUS substitute for X-ray eyes has been invented by the noted British scientist Prof. W. L. Bragg, Director of Cavendish Laboratory, Cambridge University. (*Nature*, April 22)

The new device makes visible through a microscope the appearance of the invisible lattice arrangements of atoms in a crystal as they would be seen if the eye were sensitive to X-rays.

Prof. Bragg who, with his father Sir William Bragg, was a co-winner of the Nobel Prize in 1915 for his work in X-ray structure, uses holes drilled in a brass plate to make this feat possible.

First step is to take an X-ray diffraction picture of the crystal under study. The characteristic bright spots on this picture represent the diffraction scattering of X-rays from the rigidly-fixed atoms in the lattice of the crystal.

Next Prof. Bragg calculates the size and position of the holes in the brass plate which will give a similar diffraction pattern when viewed in ordinary light.

This specially-prepared brass plate is then placed between two lenses. At one

lens' focus is placed a monochromatic light and the focus of the second lens falls on a pin hole which is observed with a microscope.

The diffraction of the light from the multiple holes in the brass plate results in a very realistic image of the crystal structure as if seen through the microscope. In effect, the observation is equivalent to having X-ray eyes.

Further research is seeking a way to place films over certain of the holes which will have a half-wavelength retardation to the light.

"If this can be found," Prof. Bragg states, "the method may prove to be of practical use in crystal analysis."

*Science News Letter, May 6, 1939*

## GENERAL SCIENCE

## War-Service Register Of British Scientists

**A** WAR-TIME register of scientific research workers is being compiled by the Royal Society for the Ministry of Labour in Great Britain. Forms were

circulated to scientists asking for details of experience and whether they would be willing to volunteer to go abroad.

Prof. A. V. Hill, honorary secretary of the Royal Society is chairman of the sub-committee of the Central Register Advisory Council attached to the Ministry of Labour. Some scientists are now on as many as three registers: Those organized by the Royal Society, the Medical Research Council, and the British Medical Association.

*Science News Letter, May 6, 1939*

Many of the Indian trails followed ways taken by game in search of new feeding grounds.

"Painting" garden soil black with a chemical preparation is said to conserve the heat of the sun in the soil.

Because drug addicts try to keep their habit a secret, it has never been possible to take an accurate census of addiction in the United States.

## ● Earth Trembles

Information collected by Science Service from seismological observatories and relayed to the Jesuit Seismological Association resulted in the location of the following preliminary epicenter:

Saturday, April 29, 8:55.3 p. m., EST

On edge of Coral Sea northeast of Australia. In region of latitude, 12 degrees south, longitude 158 degrees east. Severe shock.

For stations cooperating with Science Service in reporting earthquakes recorded on their seismographs see SNL August 13.

### JUST PUBLISHED

#### What Snake Is That?

By Roger Conant and William Bridges. A simplified field reference book that will enable anyone to quickly identify any snake of the United States east of the Rocky Mountains. Completely illustrated by Edmond Malnate.

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PSYCHOLOGY—SOCIOLOGY

# Best Cities Distinguished By Dentists, Not Clergymen

Communities Differ Enormously in "Goodness of Life"; Church Membership Found in Inverse Proportion

**P**REACHERS and church members are most numerous where "general goodness of life for good people" is at low ebb, it is shown by a three-year survey of American cities conducted by Dr. Edward L. Thorndike, prominent educational psychologist of Teachers College, Columbia University.

Measuring the G of cities (which stands for goodness, not godliness), Dr. Thorndike found that dentists, not clergymen, are characteristic of the best cities. Good cities have an abundance of artists, engineers, musicians, nurses and teachers. They have few lawyers, actors, veterinarians, and domestic servants.

Dr. Thorndike's G ratings of cities are made public in his new book "Your City," (Harcourt, Brace, and Company).

Church membership Dr. Thorndike found to be in inverse relation to this rating of general goodness of life. These impersonal ratings raise challenging questions, he declared.

"What are the churches doing with their prestige and power if they are neither helping the health and education and recreation of a community nor improving the personal qualities of its residents?" is one of these questions.

Communities with the largest percentage of church members, he found, are below average in good reading, home ownership and continuance in school, and have more than their share of illiterates and child labor.

Church membership is, however, antagonistic to homicide, deaths from ve-

neral diseases and illegitimate births.

"Unless the better communities under-report their church membership or the worse communities over-report theirs, we must suspect that the churches are clubs of estimable people and maintainers of traditional rites and ceremonies rather than powerful forces for human betterment," Dr. Thorndike concluded.

Dr. Thorndike's G Rating was based on a very wide variety of facts, including illiteracy and crime statistics, circulation of books from the public library, ownership of automobiles and radios, death rates from appendicitis and syphilis, salaries of policemen and teachers, value of city property in schools, parks, and so on, child labor, cost of living and even the price of permanent waves.

Cities in the United States differ enormously, Dr. Thorndike found. The chance that a baby will die within a year after it is born is four times as great in some of the cities as it is in others. The probability that a little girl of 10 to 14 years old will be working for a wage was over 50 times as great in 1930 in some cities as in others. Some cities spend 40 times as much per person for parks and recreation as do others.

A city can absorb foreign-born immigrants without damage, Dr. Thorndike found. If it attracts the abler and better of them, there will be a notable benefit, he said. But a high percentage of Negro families is a bad sign.

"It is wasteful and dangerous, as well as cruel," declared Dr. Thorndike, "to

maintain Ghettos, black belts, Chinatowns, and the like in space or in thought, as regions of inferiority, hopelessness, and neglect. Social stratification is probably unavoidable, and may be desirable, but it should be related to abilities and interests rather than to the pigment in one's skin or the church to which his parents belonged."

The ways in which people spend their money Dr. Thorndike found to be significant in relation to the goodness of their city. The cities which spend for tobacco are very much better than those which spend for drugs, and in this Dr. Thorndike finds a warning for the Puritan.

"There is some psychological evidence," he said, "that most human beings must be allowed a certain amount of self-indulgence, and that the normal problem is to gratify it in reasonable and relatively innocent ways. Of the proverbial trio, for example, song would then be recommended."

Good cities, he found, have a slight tendency to buy from chain stores rather than single stores.

Membership in Kiwanis and Rotary Clubs is no index to the best in city life.

"Large membership in them," Dr. Thorndike said, "is a symptom of a community of good people with low incomes, and of average total welfare."

## "G" Ratings For Cities

"G" (goodness of living) ratings for cities over 30,000 population are shown in the following table compiled by Dr. Edward L. Thorndike of Teachers College, Columbia University. The higher the score the better the conditions for the total population. Southern cities would score higher if conditions for the white population only were rated:

- 62 Pasadena
- 58 Montclair, Cleveland Heights
- 57 Berkeley, Brookline
- 55 Evanston, Oak Park
- 55 Glendale, Santa Barbara, White Plains
- 54 Santa Monica
- 53 Long Beach, Lakewood
- 52 Alameda, Newton, New Rochelle, East Cleveland
- 51 Oakland, San Jose, East Orange
- 50 Los Angeles, Santa Ana, Colorado Springs, Mount Vernon
- 49 San Diego, Springfield (Mass.)
- 48 Grand Rapids, Kalamazoo, Minneapolis, Plainfield
- 47 Fresno, Bloomfield, Rochester, Seattle, Madison
- 46 Stockton, Arlington, Medford, Quincy (Mass.), Battle Creek, Highland Park, Duluth
- 45 Sacramento, San Francisco, Hartford, Berwyn, Waukegan, Cedar Rapids, Des Moines, Lincoln, Schenectady, Mansfield, Portland (Ore.), Spokane, Racine
- 44 Denver, Rockford, Fort Wayne, Topeka, Boston, Watertown (Mass.), Dearborn, Jackson (Mich.), Muskegon, St. Paul, West New York, Albany, Elmira, Jamestown (N. Y.), Syracuse, Yonkers, Nor-

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- 42 New Haven, Richmond (Ind.), Davenport, Waterloo, Everett (Mass.), Detroit, Port Huron, Orange, Buffalo, Watertown (N. Y.), Canton, Cleveland, Youngstown, Erie, Kenosha, West Allis.
- 41 Rock Island, South Bend, Wichita, Pittsfield, Waltham, Kearney, Binghamton, New York, Dayton, Pittsburgh, Williamsport, Tacoma.
- 40 Cicero, Elgin, Haverhill, Flint, Poughkeepsie, Tulsa, New Castle, Everett (Wash.), Sheboygan.
- 39 Bridgeport, New Britain, Waterbury, Bloomington (Ill.), Anderson, Hammond, Terre Haute, Council Bluffs, Portland (Me.), Revere, Somerville, Pontiac, Jersey City, Newark (N. J.), Cincinnati, Newark (O.), Superior.
- 38 Meriden, Chicago, Moline, Dubuque, Sioux City, Brockton, Holyoke, Hamtramck, Kansas City (Mo.), Bayonne, Camden, Clifton, Elizabeth, New Brunswick, Paterson, Union City, Lorain, Springfield (O.), Altoona, Lancaster, Reading, Wilkes-Barre.
- 37 Pueblo, Wilmington (Del.), Peoria, Indianapolis, Saginaw, Butte, Hoboken, Akron, Columbus (O.), Lima, Warren, Bethlehem, Johnstown, York, Wichita Falls, Lacro.
- 36 San Bernardino, Decatur, Springfield (Ill.), Gary, Muncie, Fitchburg, Bay City, Passaic, Amsterdam, Hamilton, Steubenville, Scranton, Ogden, Wheeling.
- 35 Phoenix, Danville, Kokomo, Salem, St. Louis, Troy, Marion, McKeesport, Philadelphia, Providence.
- 34 Norwalk, Alton, Lawrence, Joplin, Perth Amboy, Trenton, Utica, Portsmouth (O.), Zanesville, Muskege, Cranston.
- 33 Quincy (Ill.), Evansville, Chelsea, Auburn (N. Y.), Allentown, Norristown, Huntington.
- 32 East Chicago, Cumberland, New Bedford, Taunton, Oklahoma City, Pawtucket, Amarillo, Charleston (W. Va.).
- 31 Tampa, Covington, Baltimore, Fall River, Lowell, Springfield (Mo.), Manchester, Nashua, Asheville, Hazelton, Fort Worth, Roanoke.
- 30 Fort Smith, East St. Louis, Kansas City (Kan.), Rome, Chester, Dallas, Waco.
- 29 Tucson, Louisville, Baton Rouge, Chicopee, St. Joseph, Austin, Houston.
- 27 Woonsocket, Beaumont, Port Arthur, Richmond (Va.).
- 26 Jacksonville, Hagerstown, Greensboro, Nashville, El Paso, San Antonio, Lynchburg, Newport News, Norfolk.
- 25 Birmingham, Atlanta, Lexington (Ky.), Galveston, Portsmouth (Va.).
- 24 Little Rock, Charlotte, Raleigh, Memphis.
- 23 Paducah, Lewiston (Me.), Knoxville.
- 22 Mobile, Pensacola, Shreveport, Chattanooga.
- 21 New Orleans, Wilmington (N. C.), Winston-Salem.
- 20 Montgomery, Macon, Jackson (Miss.), Columbia (S. C.), Laredo.
- 19 Savannah, Durham.
- 17 Augusta, Columbus (Ga.), Meridian, High Point, Charleston (S. C.).

# BOOKS

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Other contributors have included Sir James Jeans, Sir Arthur Eddington, Lord Rutherford, Dr C. G. Darwin and Sir Hubert Wilkins.

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## DISCOVERY

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Vegetable Cinderellas

"THEY were in the direst extremity, having been forced to subsist on wild roots and berries for several weeks."

Over and over again that sentence or its equivalent crops up in accounts of early days, when exploring parties got lost, or emigrant wagon trains ran out of supplies in the Great American Desert. Yet all around them were Indians who, though they might not have found life very soft, nevertheless had managed for centuries to subsist at least in part on those same wild roots and berries.

Re-acquaintance with the food possibilities of neglected wild plants is offered in a new book, *Edible Wild Plants*, by Oliver Perry Medsger, emeritus professor of nature education at Pennsylvania State College. Prof. Medsger does not content himself with telling what wild plants are good to eat; he gives recipes, and has personally cooked and eaten most of them himself.

Many wild food plants are still appreciated; at least part of the blueberries and cranberries that come to our markets are gathered in the wild, and open-air gourmets declare that for flavor no cultivated strawberry can touch the

wild species. Likewise, of course, the best mushrooms are those that come from fields and woods and not from the caves and cellars of cultivation—particularly the edible morel, figured by Prof. Medsger as frontispiece in his book.

But who would expect stinging nettle or skunk cabbage to be possible food sources? Prof. Medsger knew of the use of young nettles as soup vegetables in Scotland, but he was skeptical about skunk cabbage until a friend convinced

him with a tasty dish of their tender young leaves and petioles, after all the "skunkiness" had been stewed out of them.

More substantial fare is offered by many kinds of fleshy roots, bulbs and rhizomes, all of which were staples of primitive Indian diet. Notable are the roots of wild morning-glories, which are botanical first cousins to the cultivated sweet potato.

*Science News Letter, May 6, 1939*

## PSYCHOLOGY

## Mr. Ape Doesn't Learn Well When Mrs. Ape Is Teacher

MRS. APE can learn by aping Mr. Ape but he can't learn from her so well—not because of sex difference but apparently because it is hard for a dominant animal to take lessons from a submissive one. This observation of ape ways, of possible implication in education of their human relatives, was reported to the Southern Society for Philosophy and Psychology by Dr. James H. Elder, of the Yale Laboratories of Primate Biology at Orange Park, Florida.

Despite popular notions, it is quite a trick for an ape to crack open a stubborn coconut. They can roll it around and fumble with it for a long time without getting anywhere. Only once did Dr. Elder find a chimpanzee who could crack the nut by his own efforts; that seemed to be a happy accident.

It takes a firm hold and a sharp pound against the concrete floor. After Dr. Elder had allowed his chimpanzees to struggle alone until they gave up the problem, he showed them how. Two apes learned in just one demonstration. They could then show other apes how, and they can learn just as quickly from each other.

But in two cases where the ape "instructor" was demonstrating for a dominating animal, the pupils could not learn even after as many as 16 demonstrations. These two poor learners were not dumb, either; one, in particular, was very intelligent.

### Shorthand To Teach Deaf

TEACHING deaf children to talk by use of shorthand, a method devised by Alexander Graham Bell, has at last been vindicated by science.

"Entirely feasible," is the verdict pronounced by Dr. Max F. Meyer, of the University of Miami, as a result of experiments on half a dozen children.

The method, as proposed by Bell, was first to teach the reading and writing of shorthand words, unabbreviated, then the pronunciation of such words, phonetically written, and only after that the reading and writing of ordinary English.

"Fifty years ago, it was," related Dr. Meyer, "when Bell hired a teacher for his small experimental school, but she had not enough patience to continue the experiment for more than one year. In so short a time nothing could be proved.

"The professional teachers of the deaf ever thereafter scorned Bell's idea, saw nothing good in it. They meted out the same scorn to me when, ten years ago, I began to revive Bell's idea. They even refused to let me announce it in the very *Volta Review* which Bell founded and endowed to spread the teaching of speech to the deaf."

*Science News Letter, May 6, 1939*

The Ukrainian steppes provide one-fourth of the Soviet Union's cereal crop.

### highlights of the science QUEST sensation condensed of 1939

packed full of unusual and fascinating reading—grow plants in chemicals in school room or home—clear detailed instructions—COLCHICINE threatens to alter our whole existence by creating unheard of new forms of plants overnight, all details—plants hormones and vitamins—The strange N'Goureyima Meteor—chemical of confidence—Government publications price lists.—Educators and lovers of unusual scientific literature will enjoy every minute of Quest. Only 5,000 copies. While they last 25c per copy postpaid. Send to

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## ● RADIO

Dr. Rock Sleyster, president-elect of the American Medical Association, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, and Miss Jane Stafford, medical writer, over the coast to coast network of the Columbia Broadcasting System, Monday, May 8, 5:45 EDST, 4:45 EST., 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.



GENERAL SCIENCE

# Mesotrons, in Upper Air, Produced by Cosmic Rays

**Welterweights Among Atomic Particles, Between Protons And Electrons in Weight, Abundant Above 25,000 Feet**

**M**ESOTRONS, recently discovered welterweight atomic particles which are intermediate in mass between heavyweight protons and lightweight electrons, are abundant in nature, but in a part of the outdoors that few of us ever get to—the upper air above 25,000 feet, Prof. Arthur H. Compton of the University of Chicago reported to the American Philosophical Society.

Instruments for detecting and counting these particles were exposed at sea level, on mountain heights and in a high-flying airplane by several of Prof. Compton's associates. At sea level and up to 14,000 feet, he said, mesotron production is almost non-existent. At 20,000 feet it is readily observable, and at 25,000 feet it is abundant.

Calculations based on observations at accessible altitudes indicate that greatest mesotron production goes on close to the very top of the atmosphere. At this level, the mesotrons are produced by bombardment of atmospheric molecules by incoming cosmic rays. At lower altitudes, Prof. Compton stated, photons (particles of light) and secondary cosmic rays are responsible. The mesotrons thus produced in the upper levels of the atmosphere disintegrate into smaller particles by the time they reach the levels at which men live.

Among those associated with Prof. Compton in these researches were Drs. Volney Wilson, Marcel Schein, D. S. Hsiung, F. R. Shonka and P. S. Gill.

## Celestial Pinwheel

**M**EASUREMENTS of the rotation of the sky's most famous giant pinwheel, the great spiral nebula in the constellation Andromeda, were reported by Dr. Horace W. Babcock of the Lick Observatory, University of California. This object is really a vast mass of stars and star-stuff on the order of 50,000 light-years in diameter, so that it makes a really massive wheel.

In its spinning, Dr. Babcock said, the parts near the center and the parts near the rim move at nearly the same angular

rate, just as a point on the hub and one on the tire of a wheel always keep opposite each other. This means of course that the linear velocity, the speed in miles per hour, is vastly higher in the outer parts of the nebula than it is near the center. The "arms" of the nebula are spirally curved, and Dr. Babcock found that movement is in the direction of the convex curvature.

Dr. Babcock also made an approximate calculation of the amount of material in this nebula. It amounts to 10<sup>11</sup> or 100,000,000,000 times the sun's mass.

## Six Billion Electron Volts

**C**OSMIC rays strike the outermost parts of the earth's atmospheric envelope at the terrifically high energy level of six billion electron volts, Dr. Robert A. Millikan of the California Institute of Technology reported. This figure is based on records of instruments sent aloft in small, unmanned balloons that penetrated the stratosphere and went on up until only one or two per cent. of the atmosphere remained above them.

"This maximum corresponds closely to the energy to be expected if there is a possibility of transforming into cosmic-ray energy the whole of the rest-mass of the carbon atom," Dr. Millikan explained. "This is the most abundant element save hydrogen and helium which the spectroscopist, in Dr. Bowen's hands, has revealed in the nebulae."

## Soldiers Married Late

**W**HEN a Roman soldier married at the end of a long term of honorable service in a foreign land, he received a "diploma," which legalized the status of his wife and his children, by then often pretty well grown up.

Evidence of this practice was presented before the meeting by Prof. Henry A. Sanders of the University of Michigan.

The document described by Prof. Sanders is the marriage certificate of a Roman soldier of the second century

A.D. It was found in the ruins of the Egyptian town of Karanis, where the University of Michigan has been conducting researches into the lives of the common people of antiquity, rather than those of their nobles and kings recorded in the pretentious tombs and pyramids.

The soldier's marriage "diploma," which bore the fragmentary names of seven witnesses on its back, gives a hint of the origin of the term, because it was folded double, and that is exactly the Greek meaning of the term. Curiously enough, modern graduates of schools and colleges will do almost anything to avoid folding their diplomas.

*Science News Letter, May 6, 1939*

OCEANOGRAPHY

## President Invites Scientists To Sail on Navy Ships

**T**UCKED away in a foreword to one of its articles, the newly issued report of a year's explorations and field-work by scientists of the Smithsonian Institution contains a Presidential invitation to the Institution's naturalists to use U. S. Navy ships as collecting boats.

When President Roosevelt and his fishing party last summer sailed on the cruiser Houston to the Galapagos and Cocos islands, among those on board was Dr. Waldo L. Schmitt, curator of fishes. The President has written a foreword to his report, in which he says, "I am advised that the collections he made, with the assistance of the officers and enlisted men of the Houston, have contributed greatly to the treasure of exhibits the Smithsonian already has gained possession of through previous explorations by its scientists in that part of the world we visited."

"I believe our experience points the way whereby the Smithsonian Institution, in the future, at practically no cost whatever to itself, will be able to extend its research work into other parts of the world and make it possible for its scientists still further to enrich our knowledge of natural history . . ."

"If the Smithsonian Institution, in the future, would care to be represented in such expeditions as the United States Navy and other government services send out from time to time, I shall be glad to help make the necessary arrangements."

"We cannot know too much about the natural history of this world of ours. We should not be satisfied merely with what we do know."

*Science News Letter, May 6, 1939*

# •First Glances at New Books

## Radio

**HISTORY OF RADIO TO 1926**—Gleason L. Archer—*American Historical Soc.*, 421 p., illus., \$4. A definitive, detailed history of radio, going back so far as to include even an account of communications by signals in early times. Besides the story of radio's invention and of technical developments, the volume contains an account of the fierce struggle for control of the airwaves during the 'twenties and the rise of network broadcasting, as well as the emergence of the radio microphone as a significant factor in American political life.

*Science News Letter, May 6, 1939*

## Seismology

**DESCRIPTIVE CATALOG OF EARTHQUAKES OF THE PACIFIC COAST OF THE UNITED STATES, 1769 TO 1928**—Sidney D. Townley and Maxwell W. Allen—*Univ. of California Press*, 297 p., \$2. Bulletin of the Seismological Soc. of America, Vol. 29, No. 1.

*Science News Letter, May 6, 1939*

## Entomology

**THE BOYS' BOOK OF INSECTS**—Edwin Way Teale—*Dutton*, 237 p., \$2. Vividly written and exceptionally well illustrated with many full-page halftones as well as line drawings showing how to make and use collectors' apparatus, this book is bound to appeal to boys—and will doubtless turn many a father into an assistant to his entomological offspring.

*Science News Letter, May 6, 1939*

## Marine Biology

**BETWEEN PACIFIC TIDES**—Edward F. Ricketts and Jack Calvin—*Stanford*, 320 p., \$6. The tide-zone biota is taken up by habitats, and accounts are given of habits and life histories, so far as known, in addition to morphological descriptions. There are excellent photographic and line illustrations. All round, an excellent book for laboratory use as well as for the really interested beach wanderer.

*Science News Letter, May 6, 1939*

## Economics

**YOUR CITY**—E. L. Thorndike—*Harcourt, Brace and Co.*, 204 p., \$2. See page 284.

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## Malacology

**WHAT SHELL IS THAT?**—Percy A. Morris—*Appleton*, 198 p., \$2.25. Handily pocket-sized, each brief description accompanied by a halftone illustration, this manual will be found very valuable by

sojourners at the seashore, whether they are ardent followers of a fascinating branch of nature study or just casually interested in the scattered seashells.

*Science News Letter, May 6, 1939*

## Engineering

**THE REFRIGERATING DATA BOOK. VOL. I: REFRIGERATING PRINCIPLES AND MACHINERY** (4th ed.)—*American Society of Refrigerating Engineers*, 527 p., \$4, \$4.50 foreign. Covers refrigerating, heat and power engineering, air conditioning, domestic and commercial refrigeration, and refrigeration applications. The second volume, to be published in 1941, will cover industrial and other applications of refrigeration.

*Science News Letter, May 6, 1939*

## Horticulture

**HARDY CHRYSANTHEMUMS**—Alex Cumming, Jr.—*Whittlesey House*, 168 p., illus., \$2.50. Forehanded gardeners, looking to flowers that will be in bloom next frost-time, set hardy chrysanthemums out as soon as last winter's frost is out of the ground. This attractive, practical book tells what and how.

*Science News Letter, May 6, 1939*

## Biology

**A BIOLOGY OF FAMILIAR THINGS**—George L. Bush, Allan Dickie and Ronald C. Runkle—*American Book Company*, 695 p., \$1.92. A textbook in elementary biology that should be a great success because it teaches the students to use their own eyes and ears to find illustrations in the home cat and canary, window-box and lawn, and carries them out into field and forest.

*Science News Letter, May 6, 1939*

## Botany

**EDIBLE WILD PLANTS**—Oliver Perry Medsger—*Macmillan*, 323 p., \$3.50. See page 286.

*Science News Letter, May 6, 1939*

## Psychology

**THEORIES OF SENSATION**—A. F. Rawdon-Smith—*Cambridge (Macmillan)*, 137 p., \$2.75. A British biologist writes this book in the hope of stimulating his colleagues to further research in this field.

*Science News Letter, May 6, 1939*

## Psychology

**MENTAL HYGIENE**—William Henry Mikesell—*Prentice-Hall*, 456 p., \$2.50. The author described his ideas on how suggestion can be used by the individual to promote his efficiency and happiness.

*Science News Letter, May 6, 1939*

## Horticulture

**THE GARDENER'S LIBRARY**—Edward I. Farrington, ed.—*Hale, Cushman and Flint*, \$1. per volume. **THE LAWN**, How to Make It and How to Maintain It—Charles W. Parker, 118 p.; **THE ROCK GARDEN**, and What to Grow in It—James H. Bissland, 128 p.; **THE VEGETABLE GARDEN**—Edward I. Farrington, 139 p.; **THE GARDENER'S ALMANAC**—Edward I. Farrington, 141 p. Four manuals for the home gardener, uniform in size and format, well illustrated, combining vision of beauty and use to be achieved with practical instructions in the grubbing, back-bending labor necessary for their achievement.

*Science News Letter, May 6, 1939*

## Ornithology

**THE JUNIOR BOOK OF BIRDS**—Roger T. Peterson—*Houghton Mifflin*, 92 p., \$2. Large-print, simple-language text for young readers, and color plates by Allan Brooks and Bruce Horsfall for everybody's delight. Also, the wide margin of every page is filled with briskly executed little black-and-white sketches. All round, a most charming book, sure to engage the interest of the youngest generation of ornithologists.

*Science News Letter, May 6, 1939*

## Biology

**A CONTRIBUTION TO THE BIOLOGY OF NORTH AMERICAN VESPAE WASPS**—Carl D. Duncan—*Stanford Univ. Press*, 272 p., Paper, \$2.50; Cloth, \$3.25. A monograph covering the morphology and life history of an important and interesting insect group.

*Science News Letter, May 6, 1939*

## Zoology—Education

**QUEER FARMS**—Fred W. Orth and Maryland Van Artsdalen—*Ivan Deach, Jr., Pub., Burbank, Calif.*, 140 p., \$2. A book for boys and girls of sixth-grade age, written and illustrated by the members of the sixth grade of Ascot Public School in Los Angeles. It tells about some of the odd "farms" in Southern California, where they raise all sorts of things—ostriches, lions, alligators, even ladybirds and worms. Grownups, especially parents and teachers, can learn a good deal from this book.

*Science News Letter, May 6, 1939*

## General Science

**UNDERSTANDING OUR ENVIRONMENT**—John C. Hessler and Henry C. Shoudy—*Sanborn*, 661 p., \$1.80. A junior high school text for general science use.

*Science News Letter, May 6, 1939*